

## CLAIMS

What is claimed is:

1. A method for automatic gain control in a radio frequency receiver that outputs a down-converted, digitized signal, the method comprising the steps of:
  - coupling a received radio frequency (RF) signal to a variable gain receiver amplifier, the variable gain receiver amplifier having a gain control input, to produce a gain controlled RF signal;
  - digitizing the gain controlled RF signal to produce a received digital signal;
  - determining a wideband variance value from the received digital signal;
  - determining a narrowband variance value from the received digital signal; and
  - if the narrowband variance value is less than the wideband variance value, using the narrowband variance value to set the gain control input on the gain controlled receiver.
2. A method as in claim 1 additionally comprising the step of:
  - if the wideband variance value is greater than the narrowband variance value, comparing the narrowband and wideband variance values to determine a scale factor for the input to the variable gain amplifier.
3. A method as in claim 1 additionally comprising the step of:
  - down-converting the received digital signal, to produce a down-converted signal;
  - filtering the down-converted signal to produce a filtered received signal;

determining the narrowband variance value from the filtered received signal.

4. A method as in claim 3 wherein the down-converted signal is a baseband signal.
5. A method as in claim 3 additionally comprising the step of:  
quadrature demodulating the down-converted signal, to produce an in-phase (I) and quadrature (Q) signal used in determining the narrowband variance value.
6. A method as in claim 1 wherein the wideband variance value is determined directly from the received digital signal.
7. A method as in claim 1 wherein the wideband variance value is determined from components of the received RF signal across a bandwidth which is at least twice as wide as a bandwidth of the intended received signal.
8. A method as in claim 1 wherein the narrowband variance value is determined from components of the received RF signal across a bandwidth which is less than twice a bandwidth of the intended received signal.

9. An automatic gain control apparatus for use in a radio frequency receiver that outputs a down-converted, digitized signal, the apparatus comprising:
- a variable gain amplifier coupled to receive a radio frequency (RF) signal, the variable gain receiver amplifier having a gain control input, and to produce a gain controlled RF signal;
  - a digitizer, connected to digitize the gain controlled RF signal to produce a received digital signal;
  - a wideband variance detector, for determining a wideband variance value from the received digital signal;
  - a narrowband variance detector, for determining a narrowband variance value from the received digital signal;
  - a comparator, for comparing the wideband variance value and narrowband variance value, to set a reference level for the automatic gain control loop circuit, wherein
  - the narrowband variance value is connected to set the gain control input on the gain controlled receiver.
10. An apparatus as in claim 9 wherein the wideband variance value is determined directly from the received digital signal.
11. An apparatus as in claim 9 additionally comprising:
- a down-converter, for down-converting the received digital signal, to produce a down-converted signal;
  - a filter, connected to receive the down-converted signal, and to produce a filtered received signal; and

wherein the narrowband variance detector determines the narrowband variance value from the filtered received signal.

12. An apparatus as in claim 9 wherein the down-converted signal is a baseband signal.
13. An apparatus as in claim 9 additionally comprising:  
a quadrature demodulator, connected to receive the down-converted signal, and to produce an in-phase (I) and quadrature (Q) signal used in determining the narrowband variance value.
14. An apparatus as in claim 9 additionally comprising:  
a comparator, for comparing the narrowband and wideband variance values to determine a scale factor for the input to the variable gain amplifier.
15. An apparatus as in claim 9 wherein the wideband variance value is determined from components of the received RF signal across a bandwidth which is at least twice as wide as a bandwidth of the intended received signal.
16. An apparatus as in claim 9 wherein the narrowband variance value is determined from components of the received RF signal across a bandwidth which is less than twice a bandwidth of the intended received signal.